

**IN THE ABSTRACT**

Please replace the present abstract with the following:

**ABSTRACT OF THE DISCLOSURE**

Systems and methods are described for long subscriber loops using automatic gain control. A method includes extending a digital subscriber loop including: producing an output signal in a first direction from said first a variable gain amplifier at a mid-span extender unit responsive to an input signal in the first direction from said the digital subscriber loop; monitoring a signal strength of said output signal in the first direction at the mid-span extender unit; generating a gain control signal responsive to said the signal strength at the mid-span extender unit; and controlling a gain of said the variable gain amplifier at the mid-span extender unit responsive to said the gain control signal; and controlling a second gain of a second variable gain amplifier at said mid-span extender unit responsive to said gain control signal to produce an output signal in a second direction from said second variable gain amplifier at said mid-span extender unit responsive to a second input signal in said second direction from said digital subscriber loop. An apparatus includes a digital subscriber loop extender circuit including: a variable gain amplifier having a gain and providing an output signal in response to an input signal from a signal generator over a transmission medium, said output signal having a signal strength as a function of said gain; and a controller coupled to said variable gain amplifier, said controller generating a gain control signal that is feed back to said variable gain amplifier to automatically control said gain.